



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
|-----------------|-------------|----------------------|---------------------|

09/497,320 02/03/00 GHAEMMAGHAMI

A E0545/1516P

EXAMINER

MM91/1025

Joseph A. Sawyer Jr.
Sawyer & Associates
PO BOX 51418
Palo Alto CA 94303

DIAZ, I

ART UNIT

PAPER NUMBER

2815
DATE MAILED:

10/25/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/497,320

Applicant(s)

GHAEMMAGHAMI ET AL.

Examiner

José R. Díaz

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

➤ The abstract of the disclosure is objected to because the Abstract has more than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

➤ The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

➤ Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the claim recites the limitation of "the appropriate area", which is not defined by the Specification and seems to be a relative term.

Regarding claim 2, the recitation of "the active area" lacks proper antecedent basis.

Regarding claim 6, the recitation of "the source region and the drain region" lacks proper antecedent basis.

Regarding claims 3-5 and 7 are rejected to as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 103

➤ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2815

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

➤ Claims 1-9 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Specification in view of Hook et al. (US Patent No. 6,083,794).

Regarding claims 1, 7-8 and 14, Applicant discloses a well-known method for providing a halo implant in a semiconductor device (see pages 1-4 of Applicant's Specification) comprising the steps of: providing a DUV photoresist (213) and a halo implant (202) (see Figure 1). However, Applicant states that the art fails to teach a halo implant process wherein the thickness of the photoresist (213) is reduced. Hook et al. disclose that is well known in the art to provide a thin photoresist (18) by reducing the thickness (h). For instance see Figure 2, wherein Hook et al. teach that the reduction of the thickness (h) is given by:

$$(1) h = d \tan \theta$$

Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Applicant's Specification to include a thin photoresist. The ordinary artisan would have been motivated to modify Applicant's Specification in the manner described above for at least the purpose of making multiple asymmetrical devices on a single common substrate at different orthogonal orientations.

Regarding claims 2, 6, 9 and 13, Applicant discloses that the art fails to teach a photoresist that covers portions of source and drain regions. However, Hook et al. disclose that is well known in the art to place the photoresist at any point between the gate and a maximum distance (d), in which the source/drain regions are formed (see Figures 2-4). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Applicant's Specification to include the steps of placing the photoresist on portions of the source/drain region. The ordinary artisan would have been motivated to modify Applicant's Specification in the manner described above for at least the purpose of making multiple asymmetrical devices on a single common substrate at different orthogonal orientations.

Regarding claim 3, Applicant discloses that the art fails to teach a photoresist having a thickness of about 0.1-0.2 μ m. However, Hook et al. disclose the general conditions for a halo implant, which are given by the equation (1). Thus, it would have been obvious to one of ordinary skill in the art to reduce the thickness of the photoresist of about 0.1-0.2 μ m, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claims 4 and 11, Applicant discloses that is well known in the art to form the halo region by implanting ions (202) at a 45° angle (see Figure 2)

Regarding claims 5 and 12, Applicant discloses that is well known in the art to form LDD regions prior to implant the halo region (see page 1, lines 6-12).

➤ Claims 1, 3-5, 7-8, 11-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Specification in view of Chittipeddi et al. (US Patent No. 5,045,486).

Regarding claims 1, 7-8 and 14, Applicant discloses a well-known method for providing a halo implant in a semiconductor device (see pages 1-4 of Applicant's Specification) comprising the steps of: providing a DUV photoresist (213) and forming a halo region by a tilt-angle ion implantation (202) (see Figure 1). However, Applicant states that the art fails to teach a tilt-angle implant process wherein the thickness of the photoresist mask (213) is reduced. Chittipeddi et al. teach that is well known in the art to reduce the thickness of the photoresist mask during a tilt-angle implant process (see col. 5, lines 12-18).). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Applicant's Specification to include the steps of reducing the thickness of the photoresist to form a thin photoresist. The ordinary artisan would have been motivated to modify Applicant's Specification in the manner described above for at least the purpose of reducing shadowing.

Regarding claim 3, Applicant discloses that the art fails to teach a photoresist having a thickness of about 0.1-0.2µm. However, Chittipeddi et al. teach that is well known in the art to reduce the thickness of the photoresist to about 0.1-0.2µm (see col.

5, lines 14-16). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Applicant's Specification to include a thin photoresist of about 0.1-0.2 μ m. The ordinary artisan would have been motivated to modify Applicant's Specification in the manner described above for at least the purpose of reducing shadowing.

Regarding claims 4 and 11, Applicant discloses that is well known in the art to form the halo region by implanting ions (202) at a tilt-angle of 45° (see Figure 2)

Regarding claims 5 and 12, Applicant discloses that is well known in the art to form LDD regions prior to implant the halo region (see page 1, lines 6-12).

Conclusion

➤ The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Buxo et al. (US Patent No. 5,731,612) disclose IGFET transistor structure having a unilateral source extension.

Correspondence


Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 8:00 - 5:00 Monday through Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

- Application/Control Number: 09/497,320
Art Unit: 2815

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD
October 20, 2001



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800